DOCUMENT RESUME

ED 258 499 HE 018 408

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TITLE A Comparison of Procedures for Establishing Peer Groups. SAIR Conference Paper.
PUB DATE Oct 84
NOTE 21p.; Paper presented at the Annual Meeting of the Southern Association for Institutional Research (Little Rock, AR, October 24-26, 1984).
PUB TYPE Reports - Evaluative/Feasibility (142) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Colleges; *Comparative Analysis; *Evaluation Criteria; *Evaluation Methods; Higher Education; *Institutional Characteristics; Research Methodology; *Universities
IDENTIFIERS Kansas; National Center for Higher Educ Management Systems; *Peer Institutions; SAIR Conference; University of Kansas

ABSTRACT

This paper compares two methodologies for selecting peer institutions used by the National Center for Higher Education Management Systems (NCHEMS) and by the State of Kansas. The University of Kansas was used as a test institution to compare the NCHEMS and Kansas methodologies. Attention is directed to differences in results, the impact of data availability and data quality on results, and whether one methodology provides a better set of peer institutions than the other according to descibed criteria. The procedure used most often at NCHEMS for selecting a group of comparable institutions is based on criteria established by the home institution. After selecting institutional characteristics for judging similarity, institutions are rank-ordered by their similarity. The Kansas methodology was developed to quantitatively assess earlier peer selections that were based on informed judgment. Categories used to determine institutional similarity are enrollments, funding and expenditure patterns, and degree level. Appendices include: a list of characteristics used at NCHEMS to select peer groups for four-year institutions; a list of factors and weights used to determine peer groups for the University of Kansas using the Kansas methodology, and a list of strengths and weaknesses of the two methodologies. (SW)

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A Comparison of Procedures for Establishing Peer Groups

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October, 1984

A Paper Presented at the Annual Meeting of the
Southern Association for Institutional Research
Little Rock, Arkansas

HE 018 408

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SOUTHERN ASSOCIATION FOR INSTITUTIONAL RESEARCH

This paper was presented at the 1984 Annual Conference of the Southern Association for Institutional Research held in Little Rock, Arkansas, October 24-26, 1984. It was reviewed by the SAIR Publications Committee and was judged to be of interest and pertinent to others concerned with the research in higher education. This paper has therefore been selected to be included in the ERIC collection of Conference Papers.

Richard D. Howard
President, SAIR

A COMPARISON OF PROCEDURES FOR ESTABLISHING PEER GROUPS

Abstract

The absence of standards to evaluate financial problems and increased emphasis on accountability has caused increasing pressure to use comparative data to establish norms for evaluating programs and budgets. Typically administrators want a set of "peer" institutions for these purposes. A number of methodologies have been developed and this paper will contrast two of them.

Introduction

The pressures for institutions to use external sources as a means to rationalize their activities continue as a result of financial stress and an emphasis on accountability. The lack of any absolute standard or frame of reference for evaluating institutional performance is also a contributing factor. It is not known how broad the curriculum should be at a certain type of institution, or how much the cost should be to produce a given number of credit hours, or what percentage of an institution's budget should be spent on library or other services. In the absence of standards, administrators turn to the behavior of other institutions, either individually or as a group, to establish norms for guidance.

Typically administrators want a set of "peer" institutions--institutions quite similar to their own--for planning, resource allocation, and performance measurement purposes (Terenzini, et al., 1980). There are many methodologies available for determining an institution's peer group including those developed by the American Association of University Professors (AAUP), the Carnegie Commission for Higher

Education, the National Center for Higher Education Management Systems (NCHEMS), and by individual states such as Kansas and Washington.

Each of the methodologies for identifying peer institutions uses different criteria but usually includes some subset of the following variables: enrollment, number of degrees earned, programs offered, professional staffing, average salaries, and research expenditures, among others. The extent of the differences of these two methodologies in producing a set of peer institutions is not known.

As external agencies (coordinating boards, state budget offices, legislatures) increasingly rely on peer data for evaluating programs and budgets, institutions are growing more concerned about the selection of peers. This paper will compare and contrast the methodologies developed and used at NCHEMS and by the State of Kansas for selecting peer institutions. Some of the questions to be addressed will be: 1) are there differences in the results and to what extent, 2) what is the impact of data availability and data quality on the results, and 3) does one methodology provide a better set of peer institutions according to the desired criteria.

Procedures

This section describes the methodologies developed and used by NCHEMS and by the Kansas Regents for selecting peer institutions.

NCHEMS

The procedure used most often at NCHEMS for selecting a group of comparable institutions is based on criteria established by the "home" institution--the institution searching for a peer group. The first step in this procedure is to determine which institutional characteristics should be used to establish similarity. In most instances institutional mission is used as the basis of selecting the

characteristics. Table 1 displays a list of characteristics typically used at NCHEMS for 4-year colleges or universities for selecting peer institutions. The nominal variables (set 1) are used as selection criterion whose purpose is to reduce the relevant universe of institutions. Institutions are asked to indicate the importance of each criteria, and for each response to an item checked "very important," any non-matching institutions are eliminated from further consideration.

The variables in set 2 of table 1 are interval variables used to move institutions up or down on a list of possible comparison schools. Based on a set of ranges established by the home institution for each of the variables, a candidate institution will either land in or out of the ranges established. The more frequently an institution is outside the ranges that are established, the further down the list it is placed. In addition, a weighted score is calculated, using the importance scale. A miss counts one point if the variable is "very important," one-half point for "important," and no points are added for a miss on an "unimportant" variable. The weighted sum is then used to rank-order the candidate institutions. Thus, an institution's place on the list will be a function of both how well it fits the criteria and the weight assigned to those criteria.

On the basis of the criteria established, a list of institutions rank-ordered by their "closeness" is established (refer to table 2 for an example). NCHEMS recommends that a subset of the list--approximately 15-20 institutions--should be selected as the comparison group for whatever further analysis is intended. Intervention on the part of the home institution analyst is critical because the rank-ordering program ignores the extent to which a candidate institution misses a range. A single very large miss might be sufficient reason to disqualify a candidate institution from further consideration, even if it did well on the other comparison dimensions. Furthermore, intervention is necessary because the NCHEMS approach is not designed to be a kind of

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Table 1

NCHEMS Criteria for Comparison, 4-Year Institutions*

Set I.

Items	Your Institution	Check One: Very Imrt	Not Imrt
Control (Public/Private)			
Landgrant			
Medical School			
Urban/rural			
Region (N.Atlantic/Gr.Lakes&Plains/ Southeast/Southwest)			

Set II.

Items	Your Institution	Source	Check one: Very Imrt	Imrt	Not Imrt
Total FTE Students					
Part-time Undergrad Students					
AA Degrees					
BA Degrees					
MA Degrees					
PhD Degrees					
1st Professional Degrees					
Graduate Degrees					
BA & 1st Prof. Degrees					
Degrees in Prof. Fields					
Degrees in Non-Sci Prof Fields					
Degrees in Engineering					
Degrees in Engineering Tech.					
Degrees in Science					
Degrees in Science & Engin.					
Grad. Degrees in Sci & Engin					
Degrees in Business					
MA Degrees in Business					
Degrees in Education					
MA Degrees in Education					
Research Expenditures/ Instruction Expenditures					
Research Expenditures					
Research Exps Per FTE Student					

Urban/Rural: Urban=within any SMSA Rural=outside any SMSA

Region: N. Atlantic=CT,ME,DC,ME,MD,MA,NH,NJ,NY,PA,RI,VT
Great Lakes&Plains=IL,IN,IA,KS,KY,MN,MO,NE,ND,OH,SD,WI
Southeast=AL,AR,FL,GA,KY,LA,MS,NC,SC,TN,VA,WV
Southsouthwest=AK,AZ,CA,CO,HI,ID,MT,NV,NM,OK,OR,TX,UT,WA,WY

Percent degrees in professional fields include agriculture, architecture, computer science, engineering, health, home economics, business, communications, education, law, library science, military science, public affairs and first professional.

Science includes degrees in agriculture, the biological sciences, computer and information sciences, the physical sciences, and mathematics.

Non-Science Professional Fields include home economics, business, communications, education, law, library science, public affairs, first professional law, and first professional theology.

Medical school means having as an integral part of your institution either a medical, dental, osteopathic, or veterinary school (if you want to deal with this issue in a more precise way, such as by limiting the criterion to just veterinary schools, you may do so--just indicate the change in the appropriate cell).

All data provided by NCHEMS are from HEGIS files, and are the latest available.

* Virtually any institutional characteristics in the HEGIS database can be requested by the home institution. This particular set has been shown to have some utility for a fairly wide range of 4-year institutions.

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Table 2

Possible Comparison Institutions for Target University
Public, Non-Landgrant, No Medical School, Rural
Very Impt = %BA, %MA, %DR, %FP, Res: Instr, TotFTE
Impt = %AA, Res: Instr, %PT HC, %Degs Prof Fields
Iteration #1

Institution Name	Weighted Sum	Sum	FTE Students	%BA Degs	%MA Degs	%PhD Degs	%1st Prof Degs	%AA Degs	%Degs Prof Fields	Res: Instr	%PT HC
Target	—	—	8055	77.5	14.4	0.0	0.0	8.1	77.0	.002	17.4
1	.0	.0	9701	81.7	18.3	0.0	0.0	0.0	64.3	.004	14.0
2	.0	.0	9234	74.7	15.5	0.3	0.0	9.5	65.8	.075	19.8
3	.0	.0	8060	75.2	13.6	0.0	0.0	11.2	69.7	.013	26.2
4	.0	.0	8457	77.3	22.3	0.4	0.0	0.0	72.8	.073	22.1
5	.0	.0	6162	89.9	10.1	0.0	0.0	0.0	73.5	.019	21.2
6	.0	.0	8210	87.4	10.3	0.0	0.0	2.3	66.1	.021	15.8
7	.5	1.0	6699	74.2	15.7	0.0	0.0	10.1	69.1	.010	32.0
8	.5	1.0	9789	84.5	15.5	0.0	0.0	0.0	55.9	.036	9.1
9	1.0	1.0	8104	82.7	17.3	0.0	0.0	0.0	71.3	.041	17.7
10	1.0	1.0	9601	76.2	19.6	2.0	0.0	2.3	69.8	.080	25.9
11	1.0	1.0	2767	83.4	13.5	0.0	0.0	3.1	73.6	.011	19.1
12	1.0	1.0	11731	82.8	17.2	0.0	0.0	0.0	74.4	.016	18.3
13	1.0	1.0	4453	76.5	18.7	0.0	0.0	4.8	69.1	.007	26.0

Institution Name	Weighted Sum	Sum	FTE Students	%BA Degs	%MA Degs	%PhD Degs	%1st Prof Degs	%AA Degs	%Degs Prof Fields	Res: Instr	%PT HC
14	1.0	1.0	4430	83.8	12.5	0.0	0.0	3.8	78.8	.002	22.8
15	1.0	1.0	5468	81.9	18.0	0.0	0.0	0.1	80.2	.005	20.8
16	1.0	1.0	4754	83.1	12.0	0.0	0.0	4.8	75.5	.041	16.7
17	1.0	1.0	4946	85.2	14.8	0.0	0.0	0.0	66.3	.008	12.3
18	1.0	1.0	11257	83.6	14.9	0.8	0.0	0.6	69.4	.009	12.4
19	1.0	1.0	4453	86.2	13.8	0.0	0.0	0.0	77.0	.013	8.2
20	1.0	2.0	6984	80.4	19.6	0.0	0.0	0.0	94.9	.018	7.4
21	1.5	2.0	6743	90.9	9.1	0.0	0.0	0.0	51.2	.041	23.8
22	1.5	2.0	4473	77.6	19.0	0.0	0.0	3.4	64.4	.002	32.4
23	1.5	2.0	11646	64.5	19.0	0.0	0.0	16.5	69.8	.012	22.8
24	1.5	3.0	7638	77.8	5.7	0.3	0.0	16.2	72.2	.399	4.2
25	2.0	2.0	6563	72.1	23.5	0.0	0.0	4.4	74.9	.024	21.1
26	2.0	2.0	6506	68.7	28.3	0.0	0.0	3.0	80.2	.009	23.3
27	2.0	2.0	10523	73.0	20.1	0.0	0.0	6.9	74.6	.004	28.1
28	2.0	2.0	9175	69.0	26.4	0.0	0.0	4.6	81.4	.033	11.8
29	2.0	2.0	5796	68.9	20.7	0.0	0.0	10.4	66.9	.025	17.1
30	2.0	2.0	4155	71.0	21.0	0.0	0.0	8.1	78.1	.001	20.2
31	2.0	2.0	9457	74.6	25.4	0.0	0.0	0.0	76.8	.088	16.7
32	2.0	2.0	7037	72.4	25.7	0.2	0.0	1.7	83.9	.091	17.2
33	2.0	2.0	9935	76.2	23.7	0.1	0.0	0.0	75.0	.048	20.0

"turn-key" system for generating peer groups. Rather, it provides a quick way to find the relevant set of institutions in the HEGIS universe from which a peer group might reasonably be selected.

Kansas

The Kansas methodology was developed in 1978 to quantitatively assess earlier peer selections which were based upon "informed judgments."

To initially identify candidate institutions, the Kansas methodology allows selection from specified states, control of institution (public, private, 4-year, 2-year, etc.), number of doctoral programs offered at the two-digit HEGIS (Higher Education General Information Survey) taxonomy level of the institution, or any other characteristic recorded in the HEGIS institutional characteristics survey.

After candidate institutions are identified, three types of institutional characteristics are considered to measure similarity: (1) enrollment, (2) funding and expenditure patterns, and (3) degree programs. These characteristics and examples of relative weights used to determine institutional similarity are further detailed in table 3. Means and standard deviations are calculated for each variable. Deviation scores (z) are calculated using the formula $z_i = x_i - \bar{x}/\sigma$. The transformation of these raw data to z-scores allows further comparisons and manipulations.

A comparison score (c) between z-scores for the home institution and the candidate institutions is calculated by taking the absolute value of their differences. To compare degrees conferred, a matrix of degrees by two-digit HEGIS areas at four degree levels (bachelor, master, doctoral, and first professional) is generated. In analyzing degrees, a mean and standard deviation is found for each cell of the matrix. Comparison scores are then calculated and aggregated by degree level and divided by the number of two-digit HEGIS areas where degrees are conferred by both

Table 3

Factors and Relative Weights Used to Determine Institutional Similarity in Kansas Methodology

Characteristic	Factor	Relative Weight Example 1	Example 2	Example 3
Enrollment	Full-time equivalent enrollment	10%	5%	10%
	Headcount enrollment	5	10	5
	Graduate enrollment as a percentage of total enrollment	15	15	15
Financial	Instruction expenditures as a percentage of total E&G expenditures	2	2	2
	Research expenditure as a percentage of total E&G expenditures	2	2	2
	Public service expenditure as a percentage of total E&G expenditures	2	2	2
	Other expenditures as a percentage of total E&G expenditures	2	2	2
	Restricted use funding as a percentage of total funding	2	2	2
Bachelor's degree	Percentage of all bachelor's degrees conferred in each academic field (two-digit HEGIS category)	30	30	30
Master's degree	Percentage of all master's degrees conferred in each academic field	5	20	25
Doctoral degree	Percentage of all doctoral degrees conferred in each academic field	20	10	5
First professional degree	Percentage of all first professional degrees conferred in each academic field	5	--	--

the home institution and the candidate institution. This procedure results in four values for degrees.

The comparison scores (c) are standardized using the formula: $x_i = 50 + (10 * c_i)$. Since z-scores commonly fall in the range of -3 to 3, this transformation causes the comparison scores to become nonnegative with a broader range. Weights (totaling 100) are then applied to the standardized comparison scores and summed to create similarity scores. Since the comparison score for a home institution is zero, this process results in a similarity score of 5,000 for the home institution. According to their similarity scores, institutions are rank-ordered for the home institution. Table 4 presents a sample listing of the output using this methodology.

Comparison of Results

The University of Kansas (KU) was used as a test institution to compare the NCHEMS and Kansas methodologies to select peer institutions. Refer to appendix A for the criteria used for each of the methodologies.

A comparison of the results of the two methodologies (appendix B) reveals that among the top ten ranked institutions, seven of the institutions are the same although the rank order differs. Further analysis reveals that two of the three institutions that appear for Kansas but not for NCHEMS (#4-ranked University of Houston and #5-ranked Wayne State University) rank among the first 25 institutions on the NCHEMS listing. Similarly, two of the top ten institutions that appear on the NCHEMS list but not on the Kansas listing, rank among the top 25 institutions for Kansas. The institution that KU considers very important to have as a peer institution, University of Colorado--Boulder (CU), ranked 42nd on the NCHEMS listing.

Table 4

Peer Analysis - Summary Rank Order
Kansas Methodology

Enrollment Weights		Financial Weights		Degree Weights	
FTE	10.0	Instruction	2.0	Bachelors	30.0
Headcount	5.0	Research	2.0	Masters	5.0
% Graduate	15.0	Service	2.0	Doctorals	20.0
		Other	2.0	First Prof	5.0
		Restricted	2.0		

Rank	Institution Name	Score
1	University of Kansas (Main Campus)	5000.000
2	University of South Carolina at Columbia	5602.477
3	University of Colorado at Boulder	5618.258
4	University of Houston (Central Campus)	5637.188
5	Wayne State University	5660.352
6	University of Oregon (Main Campus)	5661.609
7	University of New Mexico (Main Campus)	5681.793
8	University of Cincinnati (Main Campus)	5697.770
9	University of Oklahoma (Norman Campus)	5768.652
10	University of Iowa	5779.605
11	Indiana University at Bloomington	5813.145
12	Arizona State University	5814.754

In order to try to get CU among the top ten institutions in the NCHEMS listing, the criteria were changed slightly. Appendix A-3 gives the criteria for the second iteration. A new listing (appendix C) was produced with the results that eight of the ten institutions were the same for both iterations although the two sets of criteria differed slightly. In the second listing CU ranked number two.

The major difference between these two methodologies is that in this example, the NCHEMS criteria used the proportion of degrees awarded by level and the proportion of degrees awarded by discipline as separate variables, whereas Kansas used the proportion of degrees awarded by level by discipline. For example, in the NCHEMS analysis, several institutions that ranked in the top 20 institutions statistically had the required proportion of graduate degrees, but the doctoral degrees were awarded only in two or three fields. The Kansas methodology would have initially screened those institutions out for having "too few" doctoral programs. The same effect can be achieved with the NCHEMS approach. The criteria, number of doctoral programs, can be added to the list of criteria (table 1), and a range and an importance level established. Or, a minimum number of doctoral programs can be set as a hardpoint requirement, removing from the list any institutions who don't offer at least that minimum number.

Conclusions

The strengths and weaknesses of the NCHEMS and Kansas methodologies are summarized in table 5. One methodology does not produce a "better" group than the other. In fact, the results show that the two methodologies produce very similar listings.

One potential criticism of both methodologies is that both rely heavily on HEGIS data which in itself has some shortcomings. However, the authors believe that since

Table 5

A Summary of the Strengths and Weaknesses
of the NCHEMS and Kansas Methodologies for Selecting Peer Institutions

	NCHEMS	Kansas
Strengths	Ease of understanding by non-statisticians	Statistically sound methodology
	Ease of implementation	Inexpensive to run
	Inexpensive to run	
Mixed blessing	Ease of manipulation can lead to game playing in certain political environments	Data detail permits extensive examination at a candidate institution, particularly degrees awarded by discipline and level
		Difficult to manipulate to achieve preconceived ideas
Weaknesses	Arbitrariness of methodology	Difficult to understand methodology by non-statisticians
	No factor for program quality	No factor for program quality

HEGIS is the only comprehensive data set available, it can and should be used with the user being aware of its limitations. For further discussion on HEGIS data quality issues, refer to Firnberg and Christal (1984).

The purposes and desires of the home institution will determine which methodology might best serve its needs. For instance, if the program emphasis is important and essential, the Kansas methodology might be the preferred technique. Or, if the home institution wants to be able to easily explain the methodology to a governing board or a legislature, the NCHEMS methodology might be selected. Other factors need to be considered in selecting peer institutions to increase the credibility.

Institutions have long been accused of selecting peers to suit their needs--sometimes to appear underbudgeted and overworked when requesting funds, other times to reflect a group of institutions they aspire to be like. As peer groups are increasingly used by exteral agencies to evaluate programs and budgets, objective analyses that can withstand political scrutiny become more important. The methodologies discussed in this paper were developed in part to respond to these concerns. However, quantitative methods cannot account for all the factors that should be a part of a peer selection process--namely, qualitative aspects of an institution. Therefore, peers produced by quantitative methodologies must be further evaluated by subjective or "informed" judgments in selecting a final group of peers. Analyses of numbers are not a substitute for good judgment but rather should enhance and inform judgment.

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Appendix A-1

Factors and Weights Used to Determine Peer Group for University of Kansas Using the Kansas Methodology

Characteristic	Factor	Weight
Enrollment	Full-time equivalent enrollment	10.0
	Headcount enrollment	5.0
	Graduate enrollment as a percentage of total enrollment	15.0
Financial	Instruction expenditures as a percentage of total E&G expenditures	2.0
	Research expenditure as a percentage of total E&G expenditures	2.0
	Public service expenditure as a percentage of total E&G expenditures	2.0
	Other expenditures as a percentage of total E&G expenditures	2.0
	Restricted use funding as a percent of total funding	2.0
Bachelor's degree	Percentage of all bachelor's degrees conferred in each academic field (two-digit HEGIS category)	30.0
Master's degree	Percentage of all master's degrees conferred in each academic field	5.0
Doctoral degree	Percentage of all doctoral degrees conferred in each academic field	20.0
First professional degree	Percentage of all first professional degrees conferred in each academic field	5.0

Appendix A-2

CRITERIA FOR COMPARISON, 4-YEAR INSTITUTIONS:

FOR University of Kansas (1st iteration)

Set I.

Items	Your Institution	Check One: Very Impt	Check One: Not Impt
Control (Public/Private)	Public	x	
Landgrant	no	x	
Medical School	no		x
Urban/rural	Urban		x
Region (N.Atlantic/Gr.Lakes&Plains/ Southeast/West&Southwest)	Great Lakes & Plains		x

Set II.

Items	Your Institution	Range	Check one: Very Impt	Impt	Not Impt
Total FTE Students	20,364	18-24,000		x	
% Part-time Headcount Students	25.3	20-30			x
% AA Degrees	0	0-5			x
% BA Degrees	65.6	55-75		x	
% MA Degrees	24.5	20-30	x		
% PHD Degrees	5.5	2-10	x		
% 1st Professional Degrees	4.3	2-6		x	
% Graduate Degrees	34.4	25-45	x		
% MA & 1st Prof. Degrees	28.9	25-33		x	
% Degrees in Prof. Fields	68.1	60-80	x		
% Degrees in Non-Sci Prof Fields	46.4	40-50	x		
% Degrees in Engineering	9.0	5-15		x	
% Degrees in Engineering Tech.	0	0			x
% Degrees in Science	9.8	5-15		x	
% Degrees in Science & Engin.	18.7	10-30		x	
% Grad. Degrees in Sci & Engin	5.3	3-10		x	
% Degrees in Business	16.1	10-20		x	
% MA Degrees in Business	3.7	2-8		x	
% Degrees in Education	13.0	10-20		x	
% MA Degrees in Education	6.3	4-10		x	
Research Expenditures/ Instruction Expenditures	.37	.25-.50	x		
Research Expenditures	$18.2m	15-35m		x	
Research Exps Per FTE Student	$907	500-2000		x	

Appendix A-3

CRITERIA FOR COMPARISON, 4-YEAR INSTITUTIONS:

FOR University of Kansas (2nd iteration)

Set I.

Items	Your Institution	Check One: Very Impt	Check One: Not Impt
Control (Public/Private)	Public	x	
Landgrant	no	x	
Medical School	no		x
Urban/rural	Urban		x
Region (N.Atlantic/Gr.Lakes&Plains/ Southeast/West&Southwest)	Great Lakes & Plains		x

Set II.

Items	Your Institution	Range	Check one: Very Impt	Check one: Impt	Check one: Not Impt
Total FTE Students	20,364	18-24,000		x	
% Part-time Headcount Students	25.3	20-30			x
% AA Degrees	0	0-5			x
% BA Degrees	65.6	55-80		x	
% MA Degrees	24.5	15-25	x		
% PHD Degrees	5.5	3-7	x		
% 1st Professional Degrees	4.3	3-10		x	
% Graduate Degrees	34.4	20-45	x		
% MA & 1st Prof. Degrees	28.9	18-35		x	
% Degrees in Prof. Fields	68.1	50-75	x		
% Degrees in Non-Sci Prof Fields	46.4	35-60	x		
% Degrees in Engineering	9.0	5-15		x	
% Degrees in Engineering Tech.	0	0			x
% Degrees in Science	9.8	7-14		x	
% Degrees in Science & Engin.	18.7	9-27		x	
% Grad. Degrees in Sci & Engin	5.3	3-7		x	
% Degrees in Business	16.1	14-20		x	
% MA Degrees in Business	3.7	2-4		x	
% Degrees in Education	13.0	7-18		x	
% MA Degrees in Education	6.3	3-11		x	
Research Expenditures/ Instruction Expenditures	.37	.25-.55	x		
Research Expenditures	$18.2m	15-35		x	
Research Exps Per FTE Student	$907	500-1500		x	

Appendix B

Comparison of the Peer Institutions Using the NCHEMS* and Kansas Methodology

NCHEMS	Kansas
1. University of Kansas	1. University of Kansas
2. University of Oklahoma-Norman	2. Univ. of South Carolina-Columbia
3. University of Iowa	3. University of Colorado-Boulder
4. University of Utah	4. University of Houston
5. University of Cincinnati	5. Wayne State University
6. University of New Mexico	6. University of Oregon
7. University of Oregon	7. University of New Mexico
8. Univ. of No. Carolina-Chapel Hill	8. University of Cincinnati
9. Univ. of So. Carolina-Columbia	9. University of Oklahoma-Norman
10. Virginia Commonwealth Univ.	10. University of Iowa

* 1st iteration

Appendix C

Comparison of the Peer Institutions Using the NCHEMS* and Kansas Methodology

NCHEMS	Kansas
1. University of Kansas	1. University of Kansas
2. University of Colorado-Boulder	2. Univ. of South Carolina-Columbia
3. University of Cincinnati	3. University of Colorado-Boulder
4. University of Iowa	4. University of Houston
5. Univ. of No. Carolina-Chapel Hill	5. Wayne State University
6. University of Oregon	6. University of Oregon
7. Florida State University	7. University of New Mexico
8. Univ. of So. Carolina-Columbia	8. University of Cincinnati
9. Univ. of Utah	9. University of Oklahoma-Norman
10. University of New Mexico	10. University of Iowa

* 2nd iteration